CLAIMS

1. In a circuit card stripline Fast Faraday cup system for measuring the structure of a charged particle beam, the system including

a first groundplane;

a first dielectric bonded to the first groundplane;

a conductor bonded to the first dielectric, a portion of the conductor used as a beam target;

a second dielectric bonded to the conductor by means of a bonding dielectric, the bonding dielectric having the same dielectric constant as the first dielectric;

a second groundplane bonded to the second dielectric, the second dielectric and the second groundplane having a channel for the unimpeded passage of the beam to the beam target; and

a high bandwidth digitizer connected to the conductor, the high bandwidth digitizer electrodynamically matched to the conductor and the beam target;

the system additionally comprising:

the first groundplane connected to the second groundplane by electroplated stitching to prevent the occurrence of a resonance condition between the first and second groundplanes.

2. The system of claim 1 further including a bias conducting ring located at the channel in the second groundplane, and a means for applying a voltage to the bias conducting ring.

3. The system of claim 1 wherein the conductor is connected to the high bandwidth digitizer by means of a single edge launch connector.

4. The system of claim 1 wherein the conductor is connected to the high bandwidth digitizer by means of two edge launch connectors.

5. The system of claim 1 wherein the high bandwidth digitizer is a sampling oscilloscope

6. The system of claim 1 additionally including a vector network analyzer, the vector network analyzer capable of processing a time-delayed, amplified charged-particle-beam-induced signal from the Fast Faraday cup including the steps of

measuring the frequency response of the cabling, vacuum interconnects, and amplifier between the Fast Faraday cup and the high bandwidth digitizer;

Fourier transforming the digitized signal from the high bandwidth digitizer; multiplying the frequency response, Fourier transformed digitized signal, and a window function; and

inverse Fourier transforming the multiplied frequency response, Fourier transformed digitized signal and window function result to obtain the calibrated time domain charge distribution in the Faraday cup.